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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/663,340	09/15/2000	Kimimori Hamada	PM 271420	1868

909 7590 12/19/2002
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EXAMINER

MONDT, JOHANNES P

ART UNIT	PAPER NUMBER
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2826

DATE MAILED: 12/19/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/663,340

Applicant(s)

HAMADA, KIMIMORI

Examiner

Johannes P Mondt

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 December 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-5,7-9,11-13 and 15-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-5,7-9,11-13 and 15-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/04/2002 has been entered.

Response to Amendment

Amendment C filed 12/04/2002 and entered as Paper No. 15 forms the basis of this office action. Please be referred to "Response to Arguments" for comments on Remarks by Applicant included in said Amendment C.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily

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published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

3. **Claims 1, 3-5, 7-9, 11-13 and 15-18** are rejected under 35 U.S.C. 102(e) as being anticipated by Mo et al (6,429,481).

With regard to claim 1: Mo et al teach (cf. Figure 1) a semiconductor device (cf. title and abstract) comprising (cf. column 4, line 45 – column 5, line 55):

a body region 36 (cf. column 5, line 1) of a first conductivity (p-type) formed in a semiconductor substrate 22/24 (cf. column 4, lines 55-58) and having a major surface opposite to a surface shared between the semiconductor substrate and the body region (see Figure 1); a plurality of trench gates 28 (cf. column 4, lines 55-59) extending through the body region; a plurality of first semiconductor regions 32A (cf. column 4, lines 63-64) of a second conductivity type (n-type) different from the first conductivity type, the first conductivity regions having a depth as measured from said major surface of the body region (see Figure 1 and front figures), at least a portion of the first semiconductor regions flanking the trench gates on both of their sides (see Figure 1 and front figures) and being in contact with said trench gates via films 26 (cf. column 4, lines 59-60) bordering and insulating the trench gates; and a plurality of second semiconductor regions 16 (cf. column 5, lines 1-3) of the second conductivity type (n-type) having a second depth as measured from said major surface of the body region that is less than the first depth (mark the word "shallow" on line 2 of column 5, see also upper front figure and Figure 1), wherein the body region is exposed between the plurality of second semiconductor regions (in regions 18; cf. column 7, lines 28-31) (for

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providing body contact) and the second semiconductor regions 16 connect the plurality of first semiconductor regions spaced apart from one another (cf. column 5, lines 1-3).

In conclusion therefore, Mo et al anticipate claim 1.

With regard to claims 3-4: in the semiconductor device according to claim 1 as anticipated by Mo et al the first semiconductor regions 32A are formed along the trench gates 28; and the second semiconductor regions 16 connect the first semiconductor regions 32A formed between the trench gates so as to form a ladder-shaped configuration (see the ladder-shaped configuration consisting of alternating N⁺ and P⁺ regions 16 and 18 indicated in Figure 1). In conclusion, Mo et al anticipate claim 3 (claim 4 is identical to claim 3).

With regard to claims 5, 7-8: gates in a MOSFET (the device of Mo et al is a vertical power DMOSFET) inherently are connected to wiring such as to vary the voltage applied to the gate in order to change the conduction state of the channel. This variation of the conduction state of the channel is the essence of this type of device and therefore the existence of a wiring member is inherent to the gate and the device.

With regard to claims 9 and 11-12: source regions in a MOSFET are inherently connected to a wiring member so as to provide the voltage head between source and drain necessary for the device to function; while the very purpose of providing regions 18 is the provision of a body contact (cf. column 7, lines 43-52).

With regard to claims 13 and 15-18: the devices of claims 1, 3, 4, 5, 7-9 and 11-12 would necessarily have to be formed in order to function. Claims 13 and 15-18 fail to further limit the aforementioned devices but instead merely state their components.

Response to Arguments

4. Applicant's arguments filed 12/04/2002 have been fully considered but they are not persuasive. In particular, Hshieh et al do teach the further limitation introduced in Amendment C; please be referred to the front figure and numeral 130 in Figure 3B taken along the line AA' of said front figure; and column 4, lines 24-26. However, the combination of Yamada and Hshieh is less persuasive after the introduction of said further limitation, considering the different objective the device taught by Yamada. However, new art, particularly Mo et al anticipating the device of all claims of Applicant has since become available, as shown in the following art rejections.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Johannes P Mondt whose telephone number is 703-306-0531. The examiner can normally be reached on 8:00 - 18:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J Flynn can be reached on 703-308-6601. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7724 for After Final communications.

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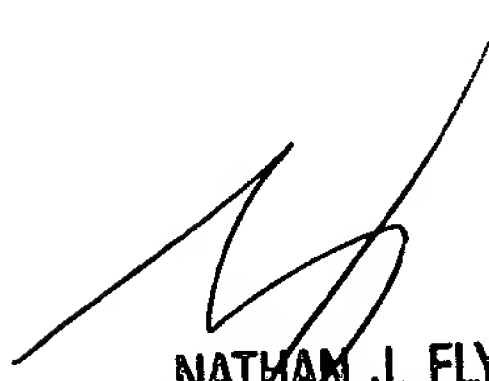
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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

JPM

December 13, 2002



NATHAN J. FLYNN
SUPERVISORY PATENT EXAMINER
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